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(12) **United States Patent**  
**Petty**

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(54) **BRAKE FLUSH MACHINE**

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**Related U.S. Application Data**

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**B65B 31/00** (2006.01)

(52) **U.S. Cl.**  
USPC ..... **141/65; 188/352**

(58) **Field of Classification Search**  
USPC ..... **141/65; 188/352**  
See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

4,741,417 A \* 5/1988 Caramanna ..... 188/352  
5,944,068 A \* 8/1999 Hool ..... 141/65

6,302,167 B1 \* 10/2001 Hollub ..... 141/65  
6,729,364 B2 \* 5/2004 Few et al. .... 141/65  
6,796,339 B1 \* 9/2004 Petty ..... 141/65  
6,830,083 B1 \* 12/2004 Hollub et al. .... 141/65  
6,929,036 B2 \* 8/2005 Awad ..... 141/65  
2003/0037837 A1 \* 2/2003 Erwin et al. .... 141/65  
2005/0098226 A1 \* 5/2005 Rounds et al. .... 141/65

\* cited by examiner

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(57) **ABSTRACT**

A fluid-distribution system includes a plurality of fluid-distribution nodes with three-way ports attached to bleed/flush lines and alternate ports attached to vacuum lines. A first pump is used to draw new brake fluid from a new fluid container, push it through the manifold and ports, and through the bleed/flush lines. Fluid flow through the ports is selectively controlled by a computing device. In this manner, a vehicle's brake system including individual brake lines and ABS systems, may be flushed in a prescribed sequence. The vacuum lines are connected to a second pump via alternate ports of the sequential control valve manifold and may be used evacuated air and contaminated brake fluid from the vehicle's bleeder valves or master cylinder. Additionally, the bleed/flush lines may be connected to the alternate ports during priming or purging of the system. This also facilitates storage of the bleed lines as it prevents brake fluid from spilling and prevents air from entering the system.

**22 Claims, 18 Drawing Sheets**

